# NOTES ON *CERAMIUM PLANUM* KUETZ., A RED SEAWEED FROM SOUTH AFRICA†

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*Ceramium planum* Kuetz., has been thought to include as synonyms, *Ceramium cancellatum* Ag. and *Pteroceras flexuosum* Kuetz. (Simons, 1966 and Papenfuss, 1952). Certain facts have emerged which confuse this interpretation. The facts are these: two forms, sufficiently distinct to be regarded as separate species, have recently been distinguished in the present concept of *C. planum;* these two forms can be assigned respectively to *C. cancellatum* sensu J. Agardh (1894) and *C. flexuosum* sensu J. Agardh (1894); the morphology of these two forms is peculiar in that the older portions are pervaded by cortical hyphae; a third specific entity, obviously closely related, has also been distinguished.

For the purposes of the present discussion these three species together will be referred to as *Ceramium planum* sensu lato.

The emergence of these facts raises several questions. If *C. planum* Kuetz. does indeed contain *C. cancellatum* Ag. and *Pteroceras flexuosum* Kuetz. as has been thought, then these three names must apply to only one of the three species in *Ceramium planum* sensu lato. The question is, which one? One of the three species is definitely excluded which leaves a choice of two. These two are too alike and too easily confused if considered superficially to allow a definite decision based on the information available in the literature. If on the other hand the present concept of *C. planum* Kuetz. is wrong and this species contains neither *C. cancellatum* Ag. nor *Pteroceras flexuosum* Kuetz., or alternatively it contains only one of them, several questions remain to be

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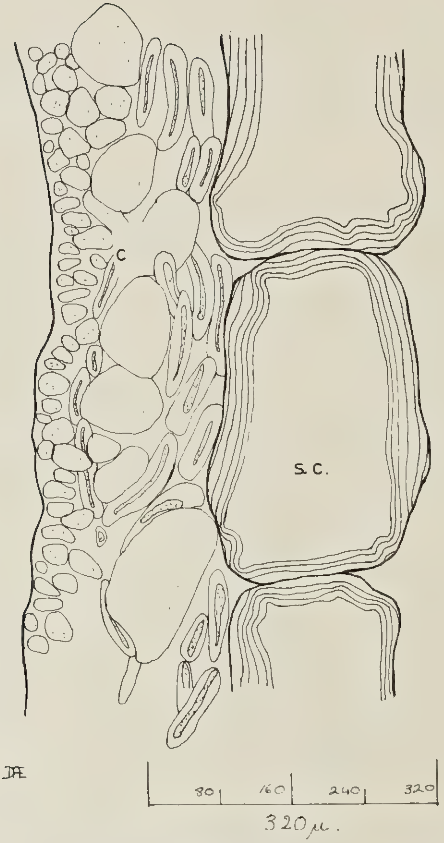

FIG. 1. *C. planum* sensu lato. Portion of longitudinal section of Simons 695A, showing central cells and part of the radially symmetrical cortical envelope. s.c.: central cells; c.: cortex. *Del. D. A. Ellis.*

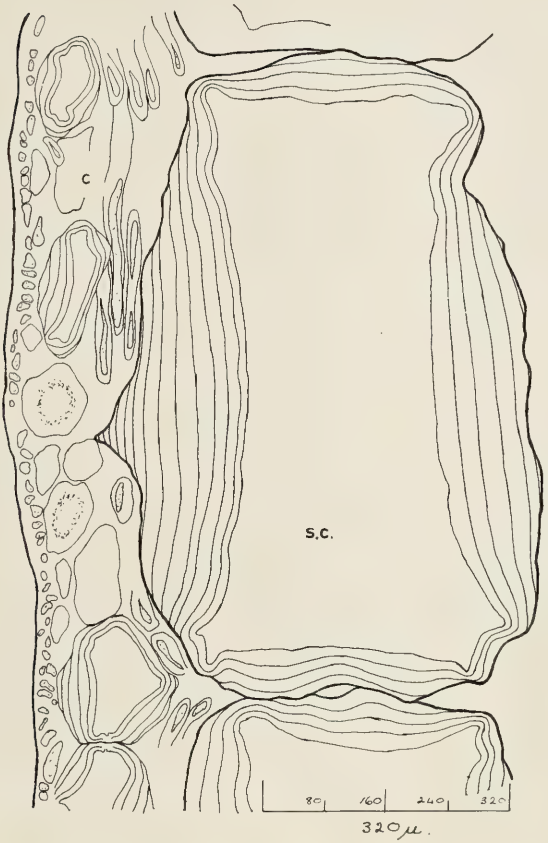

FIG. 2. *C. planum* sensu lato. Portion of longitudinal section of Simons 695B, showing central cells and part of the radially symmetrical cortical envelope. s.c.: central cells; c.: cortex. *Del. D. A. Ellis.*

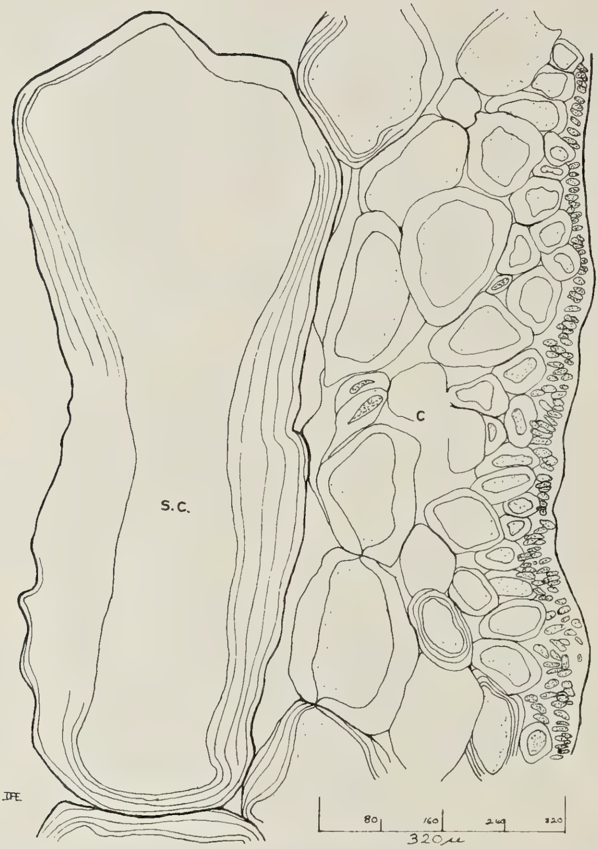

FIG. 3. *C. planum* sensu lato. Portion of longitudinal section of Simons 1900, showing central cells and part of the radially symmetrical cortical envelope. s.c.: central cells; c.: cortex. *Del. D. A. Ellis.*

answered. The literature again provides only vague indications of these answers. Kuetzing (1849 and 1863, tabs. 11 and 22) distinguished *Ceramium planum*, *C. cancellatum* and *Pteroceras flexuosum* as separate species and in fact erected the genus *Pteroceras* (Kuetzing, 1849) to contain *Ceramium cancellatum* Ag. and his newly described *Pteroceras flexuosum*. Few authorities, however, have accepted most of Kuetzing's generic near-relatives of *Ceramium* and the name *Pteroceras* was one of those to be rejected almost from the date of its inception. Thus J. Agardh in 1851 returned *Pteroceras cancellatum* (Ag.) Kuetz. to the genus *Ceramium* and followed Grunow by placing *P. flexuosum* Kuetz. in *Ceramium* too. Later authorities have continued this practice. In his discussion of these species J. Agardh (1851) claimed that *C. flexuosum* (Kuetz.) Grun. was probably identical to *C. cancellatum* Ag., and certainly on the basis of Kuetzing's descriptions of the two species concerned, this view would appear to have been justified. In this same publication (J. Agardh, 1851) *Ceramium planum* Kuetz. was included in the section '*species inquirendae*' with the suggestion that it belonged in a group of three species which included *C. cancellatum* Ag. Thus the identity of *Ceramium planum* Kuetz., as early as two years after its first publication, was already vague. In his later publications dealing with the species of *Ceramium*, J. Agardh (1876 and 1894) made no mention of *Ceramium planum* Kuetz., but in 1894 (l.c.) he distinguished *C. cancellatum* Ag. from *C. flexuosum* (Kuetz.) Grun. and gave them each specific status. That there are two species in *C. planum* sensu lato which can be assigned to *C. cancellatum* sensu J. Agardh (1894) and to *C. flexuosum* sensu J. Agardh (1894) cannot be disputed but whether in point of fact J. Agardh's use of these names is correct is a different matter; the conclusion of Papenfuss (l.c.) seems to rule against the correctness of J. Agardh. So the confusion remains. De Toni's (1903) tentative suggestion that *C. planum* Kuetz. is a synonym of *C. cancellatum* Ag. merely demonstrates more clearly that the species was not understood. Papenfuss's (l.c.) and Simons's (l.c.), therefore, remain the only two accounts equating *Ceramium planum* Kuetz., *C. cancellatum* Ag. and *Pteroceras flexuosum* Kuetz., but in the case of Simons this decision was made without the realisation that more than one specific entity was involved in the concept of *C. planum*. So far as can be deduced Papenfuss was also unaware of this taxonomic distinction and it is therefore possible that he was the more easily persuaded to overlook slight morphological differences present in the type specimens of *C. planum* Kuetz., *C. cancellatum* Ag. and *Pteroceras flexuosum* Kuetz. In the light of the presently recorded facts about *Ceramium planum* sensu lato, and because of the vagueness attached to the literary accounts of the species possibly involved, it is imperative that the type specimens of these Kuetzing and Agardh species are again examined.

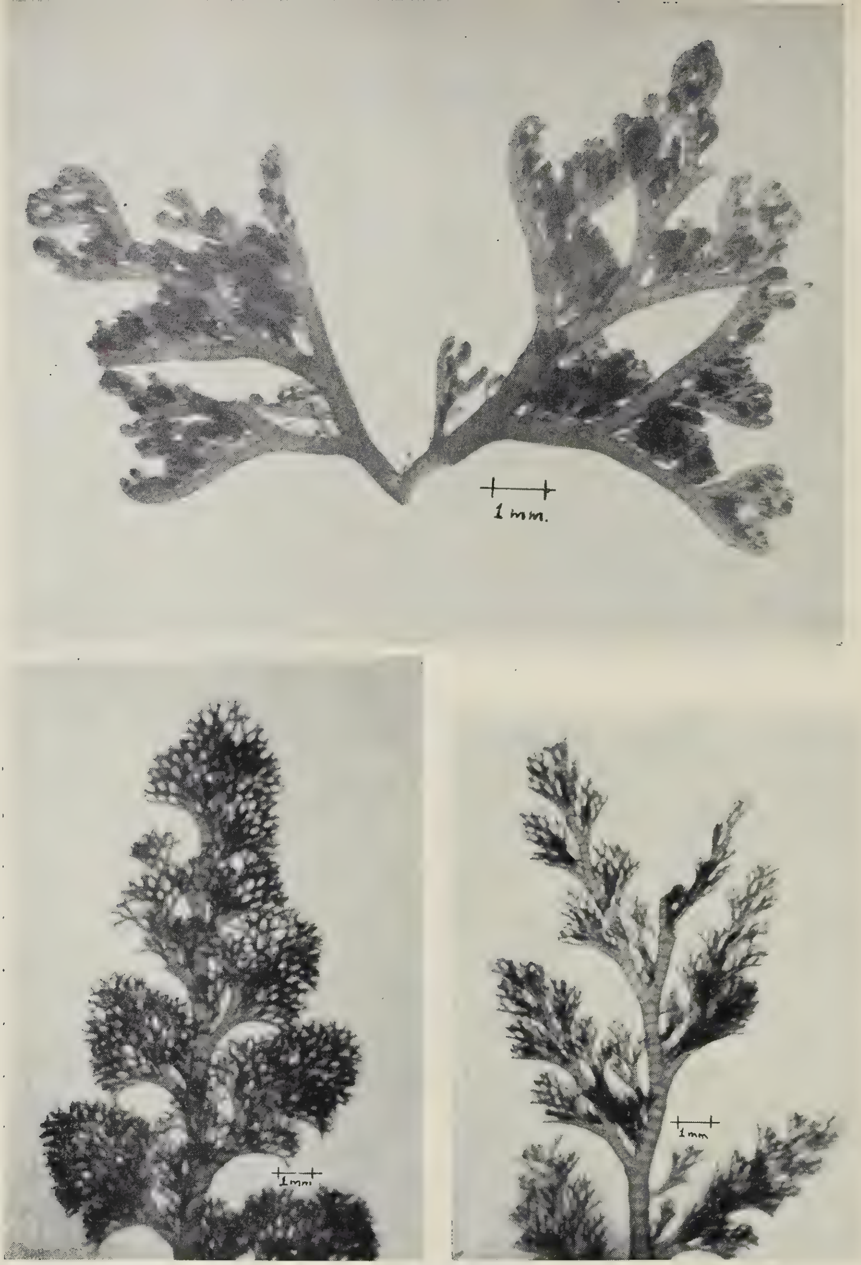

PLATE I.
A. Terminal portion of an axis of Simons 695A, showing the pattern of branching.
B. Terminal portion of an axis of Simons 695B, showing the pattern of branching.
C. Terminal portion of an axis of Simons 1900, showing the pattern of branching.
*Photos: R. Simons.*

There is a further problem so far not dealt with, which concerns the peculiar morphology of the species of *C. planum* sensu lato. All three have this in common, that the more mature portions of the axes are pervaded by cortical hyphae besides the more usual rounded or angled cells typical of the species of *Ceramium*. J. Agardh recognised such a construction in a Japanese species formerly assigned to *Ceramium rubrum* var. *virgatum* Ag. J. Agardh (1851) gave this Agardh variety species status and removed it from the genus *Ceramium* placing it as the only species of his genus *Campylaephora;* it then became *Campylaephora hypnaeoides* J. Ag. More recently Hommersand (1963) implied acceptance of the separate generic status of *Campylaephora* J. Ag. based on the presence of ramifying hyphae pervading the cortical tissue of *Campylaephora hypnaeoides* J. Ag., which in other respects complies with his accepted definition of *Ceramium* Roth. Examination of the literature has shown there is only one difference between the species of *C. planum* sensu lato and *Campylaephora hypnaeoides* J. Ag., which might be considered generically significant and this concerns the position of the tetrasporangia; in *C. planum* sensu lato mature sporangia are exserted from the cortex, whilst in *C. hypnaeoides* mature sporangia are immersed in the cortex. Modern interpretations of species of *Ceramium* do not consider the degree of immersion of tetrasporangia sufficiently important to decide their generic affinities and it seems logical, therefore, that the limits of *Campylaephora* should include species with either exserted or immersed tetrasporangia. If then the genus *Campylaephora* is to be accepted, *Ceramium planum* sensu lato must be accepted as belonging to that genus. Pending the results of a further examination of the type specimens of *Ceramium planum* Kuetz., *Ceramium cancellatum* Ag. and *Pteroceras flexuosum* Kuetz., it should be possible to say whether any or all of these species belong to the same genus as *Campylaephora hypnaeoides*, and, therefore, whether the Kuetzing name of *Pteroceras* has priority over *Campylaephora*.

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